REMARKS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Upon entry of the above amendments, claims 1-16, as amended, and new claims 17-18, will be pending. Claim 1 is independent, all other claims being dependent.

Claim 1 is amended to incorporate the feature of the monomers used to prepare the water-dissipatable polymer (see, e.g., page 8, line 39 to page 9, line 7) as well as the feature of the pendant hydroxy functional groups (see, e.g., page 1, lines 17-18).

Claims 17 and 18 are supported throughout the specification, such as, for example, page 2, lines 16-17 and page 9, lines 5-7.

The various Objections and Rejections set forth in the numbered paragraphs 1-14 on pages 2-11 and paragraph 15 on pages 12-13 of the Action will now be addressed in turn.

1. The objection to claims 9-11 and 13-16 (37 CFR 1.75(c)) is avoided by the amendments deleting the multiple claim dependencies. Applicants appreciate the Examiner's cooperation in examining the improper multiple dependent claims in order to expedite prosecution.

3. The rejection of claims 2 and 7 is avoided by replacing "obtainable" with "obtained."

5. The rejection of claims 1, 2, 7 and 9-16 as anticipated by Moffatt et al (U.S. 6,221,932) (US '932) under 35 USC 102(e) is respectfully traversed for at least the following reasons.

US '932 does not disclose the claimed feature that the colorant is attached to the water-dissipatable polymer through a covalent -O- link (now further clarified as attachment via pendant hydroxy functional group through a covalent -O- link). As seen from the linkages shown at the bottom of columns 3-4 and top of columns 5-6, and as also shown in claims 1, 8, 14 and 19, pigment, e.g., carbon black matrix, is connected via the R group of

$$-R-C(=O)-F \quad \text{or} \quad -R-S(=O)_2-F,$$

where R is an aryl, alkyl, or aralkyl group. There is no disclosure of the water-dissipatable polymer with colorant linked via covalent -O- link corresponding to the present claims.

There is no disclosure in US '932 corresponding to a water-dissipatable polymer being obtained by reaction of a water-dissipatable polymer with pendant hydroxy functional groups with colorant having a functional group capable of reacting with hydroxy functional groups as set forth in claim 2.

Claims 9-15 are not anticipated by US '932 for at least the same reasons that claims 1 or 2 are not anticipated.

Accordingly, withdrawal of this ground of rejection is respectfully requested.

6. The rejection of claims 1, 7 and 9-16, as anticipated by Foucher et al (U.S. 5,786,410) (US '410) under Section 102(a) should be withdrawn for at least the following reasons.

Contrary to the characterization of US '410 on the bottom of page 4 of the Action, there is no disclosure in this reference of a water-dissipatable polymer with pendant hydroxy functional groups and having colorant attached by means of a hydroxy functional group through a covalent -O- link. In US '410 the dye (see, e.g., claim 1) is incorporated into the polymer backbone.

Accordingly, reconsideration and withdrawal of the rejection under 35 USC 102(a) based on US '410 is respectfully requested.

7. The rejection of claims 1, 4 and 7-16, under Section 102(e), in view of Sacripante et al (U.S. 6,251,987) (US '987), should be withdrawn for at least the following reasons.

US '987 describes colored resin emulsion particles prepared by polymerization of olefinic dye molecules. As disclosed in column 6, lines 39-67, the olefinic dye molecule is generally prepared from the condensation of a dye chromophore containing at least one functional group, such as an hydroxyl moiety, with an olefinic reactive compound such as an isocyanate or acryloxy chloride. The reactive olefinic material utilized is described in column 7, lines 10-24 and is represented by the formula Y-R-CHR'=CH_2, wherein Y is NCO, Cl, Br, F, I; R is CO or an aromatic group and R' is H or an alkyl such as methyl.

Accordingly, US '987 does not disclose preparing a water-dissipatable polymer having pendant hydroxyl functional groups nor is there a disclosure of preparing a water-dissipitable polymer by copolymerizing monomers having hydroxy functional groups, or a group which is convertible to a hydroxy functional group with monomers providing water-dispersing groups and, optionally, monomers free from water-dissipating groups and hydroxy functional groups.

US '987 does not disclose a water-dissipatable polymer having colorant attached thereto by means of pendant hydroxy functional groups through a covalent -O- link.

Therefore, withdrawal of the rejection of claims 1, 4 and 7-16, as anticipated by Sacripante US '987 is respectfully requested.

9. Applicants confirm that each invention claimed herein was commonly owned when made.

10. Claims 1-7, 9-11 and 13-16 are rejected under 35 USC 103(a) as unpatentably obvious over Pawlowski (US 5,230,733) (US '733) in view of Tsutsumi et al (US 6,031,019) (US '019). Reconsideration and withdrawal of this rejection is respectfully requested for at least the following reasons.

According to US '733, up to about one-half of the hydroxy functional groups of water-soluble polymers with hydroxyl functional groups, exemplified by poly(vinyl alcohol), are converted to carboxylic acid groups. The carboxyl groups and hydroxyl groups are subsequently converted into lactone ring structures to render the polymers (with attached dye chromophore) water-insoluble.

Similar to the references discussed above, US '733 fails to disclose a water-dissipatable polymer prepared by the copolymerization of monomers having hydroxyl functional groups with monomers providing water-dispersing groups.

US '019 does not supply this missing feature.

Accordingly, the combined disclosures of US '733 and US '019 do not provide evidence that the present invention would have been prima facie obvious.

11. Claim 12 is rejected as obvious over US '733 and US '019, as applied above, in further view of Sacripante US '987.

For the reasons explained above, none of US '733, US '019 or US '987 disclose the subject matter as claimed in claim 1, from which claim 12 depends. Therefore, irrespective of whether or not motivation for the modification of the ink jet ink compositions of US '733/US '019 in view of US '987 would have existed and whether or not the practitioner would have had a reasonable expectation of success (none of which is admitted), the combined disclosures still do not provide evidence that the subject matter of claim 12 would have been prima facie obvious at the time the present invention was made.

12. Reconsideration and withdrawal of the rejection of claims 1, 2, 7-9, 11 and 13-16, as unpatentable over Ikeda et al US 5,952,429 (US '429) in view of US '019, is respectfully requested for at least the following reasons.

What is described in US '429 is, as illustrated in Figure 1, carbon black graft modified with a multiplicity of polymers having at least two different segments. There is no corresponding disclosure of a multiplicity of colorant molecules linked via -O- to a water-dissipatable polymer. In US '429, one segment (A) having groups having reactivity with functional groups on carbon black and one segment (B) having a different structure,

particularly ethylenic unsaturation to render the graft modified carbon black photocurable and/or thermosetting or carboxyl groups to render the polymer alkali developable. The segment (B) may also contribute to a higher affinity for a liquid medium than segment (A).

US '429 does not disclose a water-dissipatable polymer having pendant hydroxyl groups prepared by the copolymerization of monomers having hydroxy functional groups and monomers with water-dispersing groups. In the embodiment as described at col. 13, lines 29-42, a carbon black graft polymer is obtained by grafting a polymer containing hydroxyl group(s) to carbon black and then treating the product of grafting with an acid anhydride to introduce carboxyl groups through the half-esterification of the hydroxyl groups.

The differences between the present claims and the disclosure of US '429 would not have become obvious in view of the additional disclosures of US '019.

Therefore, the rejection under Section 103(a) of claims 1, 2, 7, 8, 9, 11 and 13-16 over US '429 in view of US '019 is respectfully traversed and withdrawal of this ground of rejection is respectfully requested.

13. Withdrawal of the rejection of claims 10 and 12 under 35 USC 103(a) over US '429 and US '019, as applied above, further in view of US '987, is respectfully requested for the same reasons as set forth above, namely, none of the cited references, individually or in combination, suggest the features as set forth in at least claim 1, therefore, the subject matters of claims 10 and 12, which depend from claim 1 (directly or indirectly) would not have been prima facie obvious.

14. Claims 1 and 3-16 are rejected under 35 USC 103(a) as unpatentably obvious over US '019 in view of Swanson et al., US 4,381,185 (US '185).

Reconsideration and withdrawal of this rejection is respectfully requested for at least the following reasons.

While it is acknowledged that US '019 recognizes low viscosity ink jet inks, this is not achieved by the features according to the present invention. US '019 does not disclose, for example, a water-dissipatable polymer prepared by copolymerizing monomers having hydroxy functional groups and monomers providing water-dispersing groups and, optionally, monomers having neither hydroxy functional groups nor water-dispersing groups.

Moreover, according to US '019 the colorant is not attached to the polymer by means of hydroxy functional groups through a covalent -O- link. Thus, as described in col. 4, lines 1-17, fine polymer particles are impregnated with a colorant, such impregnation taking the form of a state in which a colorant is encapsulated into polymer particles, or a state in which a

colorant is adsorbed onto the surface of polymer particles, or a combination of these two states.

It is respectfully submitted that one skilled in the art would not have been motivated to modify the polymer emulsion of US '019 in view of the disclosure of water-fast water-soluble polymeric dyes disclosed in US '185. Furthermore, even if motivation could be found, the practitioner would not have a reasonable expectation of success in making any such modification.

The skilled practitioner would not have been motivated to modify US '019 in view of US '185 at least for the reason that "water-fastness" as used in US '185 is intended to refer simply to resistance of the dried colored film to water (see, e.g., col. 20, lines 59-64). In contrast, water-fastness as used in US '019, is intended to refer to use in a thermal-jet system and refers to the tendency of the colorant to undergo oxidation by excess heat on the printing head heater (see, e.g., col. 1, lines 18-24).

Therefore, in view of the different objectives of US '019 and US '185, the practitioner would not have been motivated by the latter to modify the former.

Still further, there is a lack of motivation because the colorants in US '185 form true solutions in water whereas the polymers used in US '019 form emulsions in water.

Even if, notwithstanding the different objectives and environments of US '019 and US '185, it is still believed that motivation to modify the polymer emulsion of US '019 is present, the practitioner would still not have a reasonable expectation for success.

US '185 discloses a printing method using a water-based colorant, more particularly, a water-soluble polymeric dye. According to US '185, a three step process is required to achieve the water-fast printing. First, it is required to select certain types of paper (a paper selection step). Second is the colorant application step. The third step is a solvent exhaustion (evaporation, diffusion or drying) step. See, e.g., col. 1, line 58 to col. 2, line 5. In this case, the colorant is the water-soluble polymeric colorant.

Therefore, since the ink jet inks of US '019 are fine dispersions of polymer particles impregnated with colorant one skilled in the art would not have a reasonable expectation of success in achieving the water-fastness for thermal ink jet printing if the dispersions were replaced by solutions.

The practitioner would also not have a reasonable expectation of success because the process of US '185 is dependent on the selection of certain types of papers which are not required for the ink jet inks of US '019.

In any case, even if the practitioner would substitute the water-soluble dyes of US '185 for the fine dispersions of US '019, this would still not result in the inks according to the present invention. That is, US '185 does not disclose polymers made up of monomers having pendant hydroxyl groups and monomers having water-dispersing groups.

For all of the above reasons withdrawal of this ground of rejection is respectfully requested.

15. Applicants believe that the references cited as pertinent to Applicants' disclosure are no more relevant than the art relied on in the rejection of the claims.

In view of the foregoing, the claims are now believed to be in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Attached is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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Enclosure: Appendix

APPENDIX: VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

1. (Amended) An ink having a viscosity less than 20 mPa.s (cP) at 20 °C, comprising the components:

(a) a water-dissipatable polymer with pendant hydroxy functional groups, [having colorant attached thereto through a covalent -O- link,] wherein the water-dissipatable polymer has a Mn less than 25,000 and is prepared by copolymerizing:

i) 1 to 95% of monomers having hydroxy functional groups, or a group which is convertible to a hydroxy functional group;

ii) 1 to 95% of monomers providing water-dispersing groups;

iii) 0 to 95% of monomers which are free from water-dispersing groups and hydroxy functional groups

wherein i) + ii) + iii) add up to 100;

said water-dissipatable polymer having colorant attached thereto by means of a hydroxy functional group through a covalent -O- link; and

(b) a liquid medium.

2. (Amended) An ink according to claim 1 wherein the water-dissipatable polymer is [obtainable] obtained by the reaction of a water-dissipatable polymer with pendant hydroxy functional groups with a colorant having a functional group capable of reacting with hydroxy functional groups.

3. (Amended) An ink according to claim 1 wherein the colorant is attached to the water-dissipatable polymer by means of a reaction between a pendant hydroxy group on the polymer with a colorant precursor thereby forming a covalent bond there between and subsequently converting the colorant precursor to a colorant

4. (Amended) An ink according to claim 1 wherein the colorant is attached to the water-dissipatable polymer by means of a reaction between a pendant hydroxy group on the polymer with a bridging compound thereby forming a covalent bond there between and subsequently reacting the bridging compound with a colorant or colorant precursor.

5. (Amended) A water-dissipatable polymer according to claim 4 wherein the colorant precursor is converted to a colorant by a [process comprising a] diazotisation reaction.

6. (Amended) A water-dissipatable polymer according to claim 5 wherein the diazotisation reaction comprises [the steps]:

(i) diazotising an amino group in the colorant precursor using a diazotising agent; and

(ii) coupling the product of step (i) with a coupling component forming an azo group there between.

7. (Amended) An ink according to [any one of the preceding claims] claim 1 wherein the water-dissipatable polymer is an olefinic polymer.

8. (Amended) An ink according to claim 7 wherein the olefinic polymer is [obtainable] obtained from the polymerisation of one or more olefinically unsaturated monomers having water-dispersing groups, and one or more olefinically unsaturated monomers having hydroxy functional groups optionally in the presence of one or more olefinically unsaturated monomers which are free from water-dispersing and hydroxy functional groups.

9. (Amended) An ink according to [any one of the preceding claims] claim 1 wherein component (a) is completely dissipated in component (b).

10. (Amended) An ink according to [any one of the preceding claims] claim 1 which comprises from 0.5 to 50 parts of component (a) and from 50 to 99.5 parts of component (b), wherein all parts are by weight and the number of parts of (a) + (b) = 100.

11. (Amended) An ink according to [any one of the preceding claims] claim 1 wherein component (b) comprises water and an organic solvent.

13. (Amended) An ink according to [any one of the preceding claims] claim 1 for use in an ink jet printer.

14. (Amended) A process for forming an image on a substrate comprising applying thereto an ink using an ink jet printer, characterised in that the ink is as defined in [any one of the preceding claims] claim 1.

15. (Amended) A paper or an overhead projector slide printed with an ink as defined in [any one of the preceding claims] claim 1.

16. (Amended) An ink jet printer cartridge, optionally refillable, containing an ink as defined in [any one of the preceding claims] claim 1.

Claims 17 and 18 are added.

End of Appendix